Claims

1. Method for improving error correction of concatenated codes comprising the steps of
storing information bits (a_{ijk}), which form a cuboid information matrix ($A = a_{ijk}$; i, j, k = 1, 2, …n),
generating check bits (c_{ijk}) of said cuboid information matrix (A) by an outer code to obtain first code vectors ($V_{i,j}$; $V_{i,k}$; $V_{j,k}$), each first code vector ($V_{i,j}$; $V_{i,k}$; $V_{j,k}$) containing a string of the adjoining information bits ($a_{i,j,f(k)}$; $a_{i,f(j),k}$; $a_{f(i),j,k}$) and said check bits ($C_T = c_{i,j,f(k)}$; $C_C = c_{i,f(j),k}$; $C_R = c_{f(i),j,k}$),
the information matrix (A) and the check bits forming a code matrix (A, C),
cyclically interleaving the information bits (a_{ijk}) and respectively the check bits (c_{ijk}) to obtain an interleaved code matrix (B, $C^* = b_{ijk}$, c^*_{ijk}) with second code vectors (W_{ij}; W_{ik}; W_{jk}), whereby the second code vectors (W_{ij}; W_{ik}; W_{jk}) of the interleaved code matrix (B, $C^* = b_{ijk}$, c^*_{ijk}) contain only one information bit (a_{ijk}) of each corresponding first code vector ($V_{i,j}$; $V_{i,k}$; $V_{j,k}$) and
coding the bits of the interleaved code matrix (B, C^*) by an inner code,
where at least the outer code or the inner code is a three dimensional product code.

2. Method according to claim 1,
wherein the outer and the inner code are three dimensional product codes

3. Method according to claim 1 or 2,
wherein said stored information bits (a_{ijk}) (i, j , k = 1,.2, ...5) form a cube information matrix (A).

4 Method according to claim 1, 2 or 3,
wherein the interleaving of the information bits (a_{ijk}) and respectively the check bits (c_{ijk}) comprises the steps of

cyclically shifting said information bits in columns (j = 1, 2, ...) and in rows (i = 1,2, …) by different values (0, 1, 2, ..., n) and different for each parallel layer (X1 - X5- layer: k= const. 1, 2, 3, 4, 5) having the same orientation of said interleaved code matrix (A, C) to obtain said interleaved code matrix (B, $C^* = b_{ijk}, c_{ijk}$), whereby each second code vector (W_{ij}; W_{ik}; W_{jk}) of the interleaved code matrix (B, $C^* = b_{ijk}, c_{ijk}$) contains only one information bit (a_{ijk}) of each corresponding first code vector ($V_{i,j}$; $V_{i,k}$; $V_{j,k}$).

5. Method according to claim 1, 2 or 3,
wherein the interleaving of the information bits (a_{ijk}) and respectively the check bits (c_{ijk}) comprises the steps of cyclically shifting said information bits (a_{ijk}) and respectively the check bits (c_{ijk}) for each parallel layer (j = const.1, 2, 3, 4, 5 or k = const.1, 2, 3, 4, 5) of said of said code matrix (A, $C = a_{ijk}, c_{ijk}$) having the same dimensions by different values (0, 1, 2, ..., n) to obtain a first code matrix and than shifting the rows or respectively columns of rectangular layers by different values and different for each rectangular layer - or vice versa - to obtain an interleaved code matrix (B, $C^* = b_{ijk}, c_{ijk}$), whereby each second code vector (W_{ij}; W_{ik}; W_{jk}) of the interleaved code matrix (B, $C = b_{ijk}, c_{ijk}$) contains only one information bit (a_{ijk}) of each corresponding first code vector ($V_{i,j}$; $V_{i,k}$; $V_{j,k}$)

6. Method according to claim 1 to 5,
wherein the number of shift positions is altered by 1 from a row to the next row - a column to the next column - a layer to the next layer.

7. Method according to one of the claims,
comprising the steps of decoding the interleaved code matrix by an inner code,
deinterleaving the code matrix and decoding the code matrix by an inner code.

8. Method according to claim 7,
using an iterative decoding procedure.